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The millipede genus *Libanaphe* Hoffman, 1963 in Israel (Diplopoda: Polydesmida: Oxydesmidae)

Диплоподы рода *Libanaphe* Hoffman, 1963 в Израиле (Diplopoda: Polydesmida: Oxydesmidae)

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ABSTRACT. *Libanaphe adonis galilaensis* Tabacaru, 1995 is redescribed based on a recently collected male from northern Israel and elevated to full species status based on both gonopodal and somatic differences. *Libanaphe*, the only component of Libanaphinae (Oxydesmidae), therefore comprises two species, the other being the type species *L. adonis* Hoffman, 1963, in central Lebanon.

РЕЗЮМЕ. По свежему материалу из Северного Израиля переописан подвид *Libanaphe adonis galilaensis* Tabacaru, 1995, который возведен в статус полного вида на основе различий как в строении гоноподов, так и по ряду соматических признаков. Таким образом, *Libanaphe*, единственный компонент Libanaphinae (Oxydesmidae), включает два вида, вторым из которых является типовой вид *L. adonis* Hiffman, 1963 из Центрального Ливана.

Introduction

The millipede genus *Libanaphe* Hoffman, 1963, was proposed for a single species, *L. adonis* Hoffman, 1963, from Nahr-es-Safa, about 20 km SE of Beyrouth, Lebanon [Hoffman, 1963]. It was assigned to the Melaphinae (Xystodesmidae) but now represents the monobasic Libanaphinae (Oxydesmidae) [Hoffman, 1963, 1980, 1990; Tabacaru, 1995; Shelley et al., 2000]. Tabacaru [1995] proposed *L. adonis galilaensis* Tabacaru, 1995 for a form from Nahal Bezet, northwestern Galilee, Israel that differs in possessing a dorsal outgrowth at the base of the femorite, a spinulate parasolenomere, and a small spinicle at the base of the distolateral femoral process. However, he failed to trace any somatic characters that would discriminate the new subspecies. A newly collected male of *galilaensis*, deposited in the Zoological Museum of the Moscow State University, Russia, shows that full specific status is warranted, and I take the opportunity to provide new accounts of this species, apparently the only one that occurs in Israel.

Taxonomic part

Libanaphe galilaensis Tabacaru, 1995, **stat.n.**
Figs 1–12.

MATERIAL. 1 ♂, Israel, foot of Mt Hermon, Banjass (= Panjas) Nature Reserve, 300 m a.s.l., deciduous forest, in litter under stones, 11.04.2007, leg. V. Kravchenko & S.I. Golovatch. This site is approximately 45 air-km NE of the type locality.

DESCRIPTION. Length ca 27 mm, maximum width (on segments 6–16) 3.1 mm. Coloration dorsally and laterally dark brown with contrastingly yellow bases of paraterga and (yellow-)red (on anterior segments) to nearly carmine (on posterior segments) lateral calluses on paraterga; venter greyish, lighter on prozona; antennae and legs light yellow-brownish to brownish (Figs 1–6).

Head convex, shining, with a distinct epicranial suture, only labral region densely setose; frons nearly smooth (Figs 1, 5). Antennae long and slender, dorsally reaching 4th segment (Fig. 1), interantennal isthmus almost as great as antennomere 2 (Fig. 5). In width, head < collum < 2=4 < 5 < 6=17; thereafter body evidently tapering toward epiproct (Figs 2–4).

All paraterga more or less evidently rounded, subhorizontal, set high (especially in caudal 1/3 of body), mostly level to dorsum (so latter only very poorly convex); calluses rebordered only dorsally, never beak-shaped caudally, slightly thicker on pore-bearing segments compared to poreless ones (Figs 1–4). Prozona smooth and shining, suture between pro- and metazona narrow and shallow, smooth at bottom. Tergal surface dull. Ozopores lying entirely laterally close to midway (until segment 13) to caudal 1/3 of callus (on segments 15–19), pore formula normal. Limbus virtually smooth, entire and even.

Collum transversely elliptic, granular and rugulose, in caudal half with a rather evident but shallow axial impression and a few indistinct and irregularly arranged tubercles more laterally (Fig. 2); paratergal calluses relatively indistinct, anterior corners of paraterga slighly depressed (Fig. 1), posterior corner poorly obtusangular (Fig. 2). Segments 2 and 3 of similar shape (Fig. 2), former with 1+1, latter with 2+2 strong anteroparamedian tubercles and a denticuliform anterior corner of paraterga, their caudal corner strongly obtusangular, denticulate at hind margin; sides below paraterga rather finely granular; anterior shoulders of paraterga very clear and long. Segment 4 similar to both preceding ones, also roughly rugose-tuberculate, but anteromedian tubercles (1+1) smaller (like on metargum 5) while paratergal caudal corners not so strongly obtusangular. Subsequent segments evidently and increasingly granular rather than tuberculate, with a row of small, often oblong tubercles usually discernible only near caudal margin of metatergum; paraterga with increasingly shorter shoulders and more strongly reduced denticles anteriorly, as well as increasingly subrectangular and slightly projecting caudal corners. Segments 15–18 with roundly acutangular anterior corners of paraterga, segment 18 with clearly flap-shaped and especially strongly rounded paraterga (Fig. 4). Pleurosternal carinae absent. Epiproct long and coniform, subtruncate at tip (Figs 4, 7). Paraprocts slightly elevated but not rebordered near midline; hypoproct subtriangular, with straight sides, a nearly pointed tip and a pair of well-separated setae evidently removed from tip (Fig. 7).

Sterna shining, without modifications, mainly bare (Fig. 6). Legs (Figs 6, 8) long and slender, usually about 1.5 times as long as midbody height, apparently somewhat incrassate as compared to ♀. (Fig. 1).

Gonopods (Figs 9–12) complex. Coxite subglobose, with two strong distal setae anteriorly. Prefemoral part slightly longer than acropodite. Base of femorite with a distinct dorsal outgrowth (**o**). Distal part divided into two subequally long branches, i.e. a lateral, ribbon-shaped, somewhat coiled exomere (**ex**, or TT in Hoffman [1963]) and a mesal, slightly larger and nearly straight endomere (**en**, or FF in Hoffman [1963]). A small, apically roundish solenomere (**sl**) opposing a similarly small but unciform, more distal and spinulate branchlet (parasolenomere **p**) lying near base of **en**.

Discussion and conclusion

A vivid colour pattern, not evident previously, is documented for at least males of *galilaensis*, as the yellow-reddish paraterga/calluses contrast with the dark brown background. As with most diplopod pigmentations, this colour tends to fade in alcohol, since Tabacaru [1995] apparently did not observe a pattern. Preserved material of *adonis* exhibited light brownish metaterga and legs, with the rest of the specimen being whitish [Hoffman, 1963].

In addition to the gonopodal differences mentioned by Tabacaru [1995] and detailed above, *galilaensis* actually deviates from the somatic characters of *adonis* as described by Hoffman [1963]. Metatergum 2 supports 2+2 large anterior paramedian tubercles, which may only represent intraspecific variation because the tubercles are arranged as 1+1 on metaterga 3–5 and, to a lesser degree, on metatergum 6. Additionally, dorsal tuberculation is primarily irregular instead of being arranged into distinct transverse rows. Finally the caudal paratergal corners, especially those on segments 16–19, are more strongly rounded. Thus, *galilaensis* differs from *adonis* in a suite of both somatic and gonopodal characters, which justify elevation to full specific status.

Libanaphe therefore comprises two species: *L. adonis*, in central Lebanon, and *L. galilaensis*, in northern Israel. Given the immediate proximity of both known localities of *L. galilaensis* in Israel to the border to Lebanon, it seems very likely that this species occurs at least in the neighbouring regions of southern Lebanon as well, maybe also in the adjacent parts of Syria.

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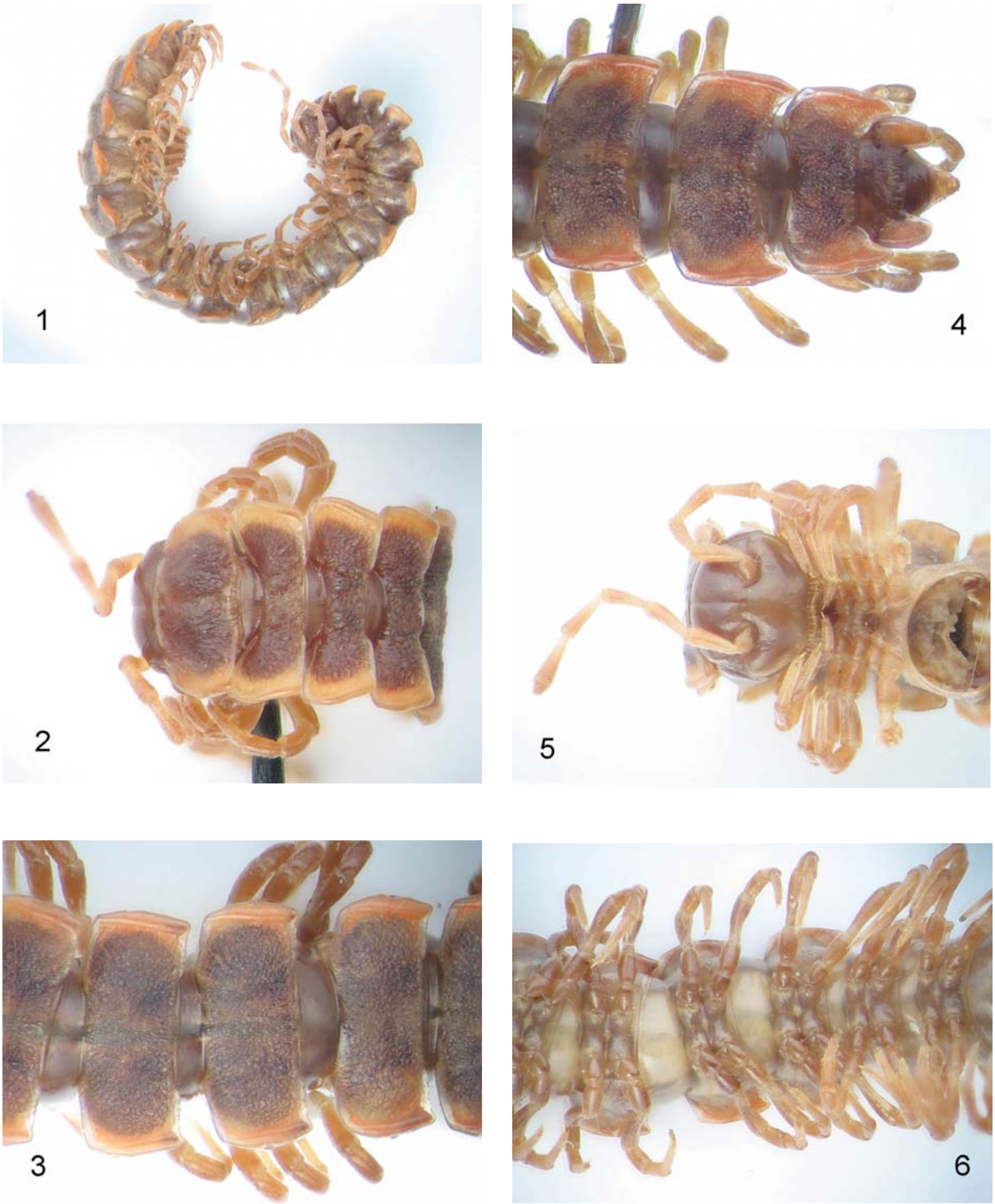
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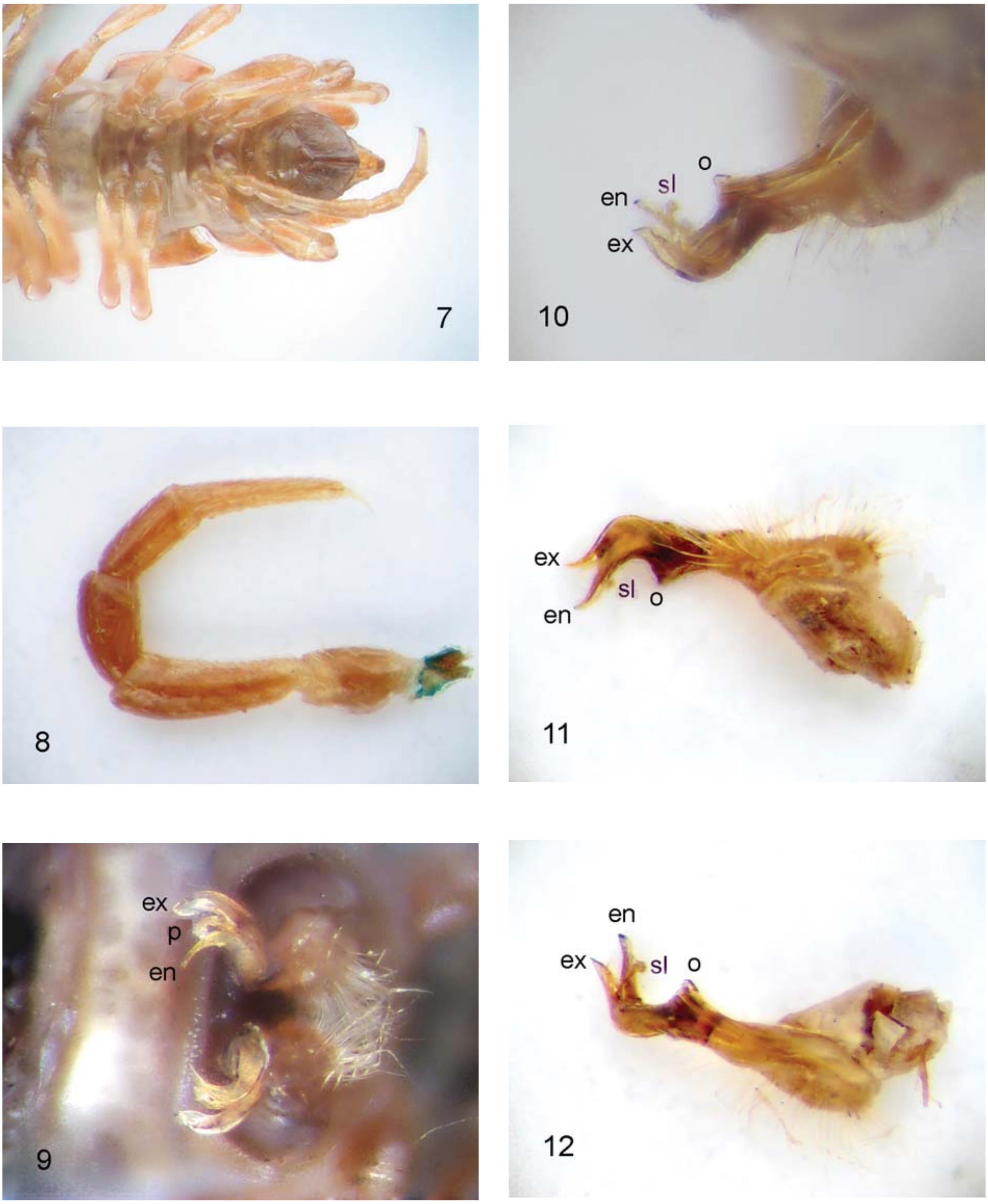
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Figs 1–6. *Libanaphe galilaensis* Tabacaru, 1995, ♂: 1 — habitus, lateral view; 2 — anterior body portion, dorsal view; 3 — segments 7–11, dorsal view; 4 — caudal body portion, dorsal view; 5 — anterior body portion, ventral view; 6 — midbody segments, ventral view. Photographed not to scale.

Рис. 1–6. *Libanaphe galilaensis* Tabacaru, 1995, ♂: 1 — внешний вид сбоку; 2 — передняя часть тела, вид сверху; 3 — сегменты 7–11, вид сверху; 4 — задняя часть тела, вид сверху; 5 — передняя часть тела, вид снизу; 6 — среднетуловищные сегменты, вид снизу. Сфотографировано без масштаба.



Figs 7–12. *Libanaphe galilaensis* Tabacaru, 1995, ♂: 7 — caudal body portion, ventral view; 8 — leg 7; 9 & 10 — both gonopods in situ, ventral and lateral views, respectively; 11 & 12 — isolated right goopod, sublateral and submesal views, respectively. Photographed not to scale.

Рис. 7–12. *Libanaphe galilaensis* Tabacaru, 1995, ♂: 7 — задняя часть тела, вид снизу; 8 — 7-я нога; 9 и 10 — оба гонопода на месте, соответственно снизу и сбоку; 11 и 12 — изолированный правый гонопод, соответственно почти сбоку и почти изнутри. Сфотографировано без масштаба.